4. REPRODUCTIVE BIOLOGY OF THE SPINY FIELD MOUSE, *MUS PLATYTHRIX*

(*With a text-figure*)

Introduction

Since the biology of *Mus* in India is poorly known, intensive study was carried out on *Mus booduga* around Tirupati (Rao 1977). A number of *Mus platythrix* were also collected and studied during the course of field work during 1975 and 1976. In this paper results of the study on reproductive biology are presented and compared with Chandrahas's (1974) results of work done at Kolar (Karnataka).

Material and Methods

Monthly collections of *Mus platythrix* were made during 1975 and 1976, in crop fields around Tirupati (13°36′ N, 79°23′ E) by excavating the burrows. The rodents were sexed and dissected for recording pregnancy, lactation, embryo numbers and number of corpora lutea. Male animals were considered to be participating in reproduction activity if they had scrotal testes (Rao 1979). The croplands had groundnut (July to November) and paddy (July to October and in part January to April also) as the major crops. The area received rainfall (mean annual = 1085 mm) during May to December. The data was pooled for both the years.

Observations and Discussion

Male fecundity :

Fecund males were found from August to April next (Fig. 1), which corresponds with the pregnancy cycle of females. Except in the month of November, the breeding rate gradually increased from August till December and then declined gradually till May. Chandrahas (1974) has reported that they breed from August to March at Kolar.

Female fertility :

Pregnant females were found from September to March next. There was also a gradual increase in the per cent pregnant females from the month of September till November declining thereafter (Fig. 1). It is interesting to observe that the numbers of fecund males and pregnant females run parallel to each other throughout the year.

Litter size:

Fifteen samples of litters yielding 57 young ones were picked up by excavating the burrows during the study period. The litter size varied from 2 to 7, the average being 3.8. Litters of large size (having 7 embryos) were collected from the fields in October and December (Table 1).

Table 1

Distribution of litters of various sizes in the monthly field-collections of *Mus platythrix* during 1975 and 1976

Month	Size of litter				Total No. of young ones	No. of lacta-ting females	Mean young per litter
	2	3	5	7			
January	0	2	1	0	11	3	3.66
February	0	0	0	0	0	0	0
March	1	0	0	0	2	1	2.00
September	0	0	1	0	5	1	5.00
October	0	1	1	1	15	3	5.00
November	1	3	0	0	11	4	2.75
December	0	2	0	1	13	3	4.33
Total					57	15	3.80

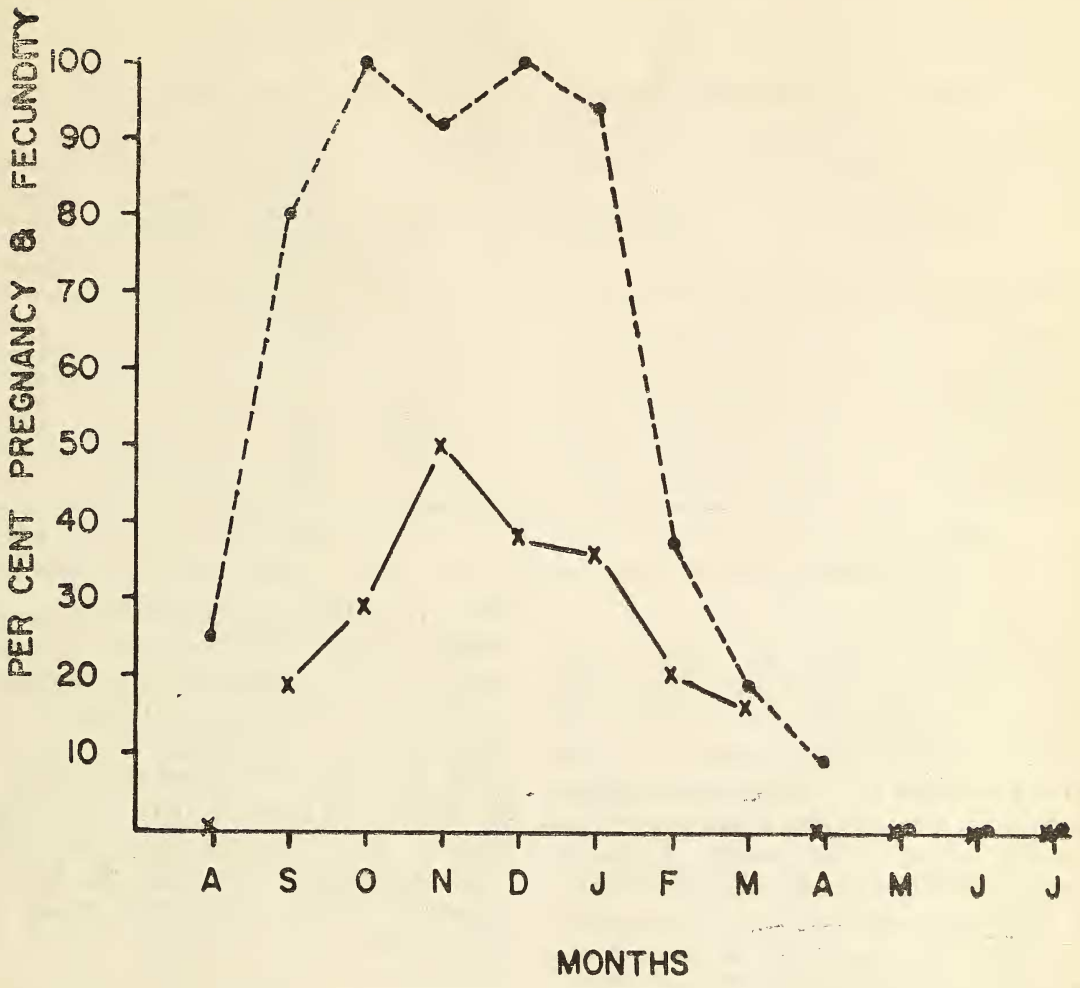

FIG. 1. Per cent female *M. platythrix* pregnant and male fecund during the year.
● - - ● Males fecund. x — x Females pregnant.

The frequency of occurrence of litters of 2 and 3 young ones was relatively common. Chandrahas (1974) has reported the litter size as ranging from 5 to 8.9, the average being 7.6. Prakash (1971) reported that the litter size in *Mus platythrix sadhu* varied from three to ten in the Rajasthan desert.

Observations on implanted embryos

Twenty two pregnant females of *M. platythrix* were examined during the course of studies with 100 visible embryos. The litter size ranged from 2 to 8, the mean being 4.54 per pregnant female. Embryos of 4 and 6 had the maximum frequency (Table 2). The litter size in the present investigation was less than the litter size of the spiny mice reported by Chandrahas (1974). In the present study right horn was found having less number of embryos (1.50 ± 1.00) than the left uterine horn (3.05 ± 1.13), the difference being statistically significant ($P < 0.001$).

TABLE 2

DISTRIBUTION OF EMBRYOS OF VARIOUS SIZES IN THE MONTHLY COLLECTION OF *M. platythrix* DURING 1975 AND 1976

Month	Size of litter 2	4	5	6	8	No. of embryos resorbing	Total No. of implanted embryos	No. of pregnant females	Mean embryos per female
January	1	1	1	1	0	2	17	4	4.25
February	0	1	0	0	0	0	4	1	4.00
March	0	1	0	0	0	1	4	1	4.00
September	1	2	0	0	0	0	10	3	3.33
October	0	2	0	1	1	3	22	4	5.50
November	1	3	0	0	1	1	22	5	4.40
December	0	1	1	2	0	0	21	4	5.25
Total						7	100	22	4.54

Pre-natal mortality

The counting of the freshly formed corpora lutea in the ovaries of pregnant females indicated that the production of ova ranged from 5.00 to 6.50 per pregnant female, the mean being 5.98 (Table 3). There was no significant difference in the magnitude of pre-implantation mortality during various months of breeding season. Maximum loss per female was observed in September when the food is abundantly available to the mice. The intensity of loss was more in the right ovary. The post-implantation loss was maximum in October and January (Table 2). The embryos towards the cervix were always found resorbing but never the ones towards fallopian tube. The resorbing embryos were observed in female with larger litter size only. This resorption may be an intrinsic physiological mechanism regulating the mouse numbers.

Annual productivity

By applying the formula of Lechleitner (1959) the annual breeding potentiality of the spiny mouse is calculated. Considering the gestation period of *M. platythrix* as 21 days (Chandrahas 1974), a female can produce 10.09 litters in a breeding season. Correcting this figure by multiplying by the mean prevalence of pregnancy the figure is reduced to 3.03/litters/female/breeding season. Converting it to ova produced per female the annual productivity of the female mice comes to 18.11. If pre-natal mortality (6.9% pre-implantation and 25.7% post-implantation) is accounted, the figure is corrected to 18.11—0.33=17.78 young per female per year.

Breeding season

It is interesting to observe that the scrotal males occurred in August and soon after in September pregnant females are found in the population. Thereafter the peak in the reproductive activity of both the sexes continues from October to January, during winter (Figure 1). Chandrahas (1974) also observed a similar cycle in *Mus* at Kolar. Most of the tropical mammals litter during winter months since during monsoon, possibly, due to excessive rains, marshy conditions prevail and the environment is not, therefore, conducive for the survival of litters of the terrestrial animals. It

TABLE 3

PRE-IMPLANTATION LOSSES IN *Mus platythrix*

Months	Number of embryos				Number of corpora lutea				Pre-implantation losses			
	Right horn	Left horn	Total	Mean ± S.D.	Right horn	Left horn	Total	Mean ± S.D.	Right horn	Left horn	Total	%
January	5	12	17	4.25 ± 1.71	11	13	24	6.00 ± 0.82	6	1	7	29.2
February	0	4	4	4.00 ± 0	2	4	6	6.00 ± 0	2	0	2	33.3
March	1	3	4	4.00 ± 0	1	4	5	5.00 ± 0	0	1	1	20.0
September	3	7	10	3.33 ± 1.16	7	10	17	5.66 ± 0.58	4	3	7	41.1
October	0	13	13	5.50 ± 1.92	12	15	27	6.50 ± 1.29	2	2	4	15.3
November	8	14	22	4.40 ± 2.19	13	18	31	6.20 ± 1.10	5	4	9	29.0
December	8	13	21	5.25 ± 0.96	12	14	26	6.50 ± 0.57	4	1	5	19.2
Total	25	66	91	4.54 ± 1.01	58	78	136	5.98 ± 0.62	23	12	35	25.7

appears also that the quality of the food available in post monsoon months may trigger the breeding activity. The availability of paddy and groundnut in the post monsoon months in the study area confirms this presumption. On the other hand, however, the breeding activity of the Indian desert mammals, inclusive of *Mus* species, is at the maximum during monsoon due to prevalence of favourable temperatures and availability of nutritive green food (Prakash 1960, 1971). Though Tirupati region falls under semi arid zone, yet the *Mus platythrix* breeds during winter like typical tropical mammals, which is interesting.

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5. WHITE PATCH AND ITS GENETIC CONTROL IN SOME OF THE INDIAN RODENT SPECIES

The albinism and colour variations in the rodents of the Indian sub-continent were reported earlier in some of the taxonomic literature dealing with Indian rodents. The occurrence of a diamond shaped white patch on the ventral surface of a house rat, *Rattus rattus rufescens* has also been reported recently (Joshee 1961, Deoras and Mithel 1974). But this fact was overlooked, because the stress was given more on the epidemic studies rather than on its genetical consideration. The fact that a white patch was seen, though very rarely, even in the field rats of the species of *B. indica* (Pradhan 1975), attracted my attention towards the